

CLAIMS

1. A method for acyltransferase reaction in which an acyl group of acyl coenzyme A (acyl CoA) is transferred characterized in that the reaction is carried out by production and/or reproduction of acyl coenzyme A from coenzyme A in a reaction system by a chemical thioester exchange reaction with an acyl group donor which is an acyl ester of a thiol compound.

10 2. The method for acyltransferase reaction according to claim 1, wherein an acyl group donor, acyl group receptor, coenzyme A and acyltransferase are contained in the reaction system at the same time, an acyl group of the acyl group donor is transferred to coenzyme A by a chemical thioester exchange 15 reaction to give an acyl coenzyme A and an acyl group of the acyl coenzyme A is transferred to the acyl group receptor.

3. The method for acyltransferase reaction according to claim 2, wherein the method is carried out together with 20 production and/or reproduction of acyl coenzyme A by an acyl group of the acyl group donor.

4. The method for acyltransferase reaction according to claim 2, wherein the thiol compound is aromatic thiol.

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5. The method for acyltransferase reaction according to claim 4, wherein the aromatic thiol is thiophenol which may optionally contain a substituent group(s).

6. The method for acyltransferase reaction according to claim 2, wherein the acyl group receptor is amino acid and/or a derivative thereof.

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7. The method for acyltransferase reaction according to claim 2, wherein the acyl group receptor is serine and/or a derivative thereof.

10 8. The method for acyltransferase reaction according to claim 1 or 2, wherein the acyltransferase is serine C-palmitoyl transferase.

15 9. The method for acyltransferase reaction according to claim 8, wherein the serine C-palmitoyl transferase is derived from bacteria of genus *Sphingomonas*.

20 10. The method for acyltransferase reaction according to claim 1 or 2, wherein the acyltransferase is a sphingosine N-acyl transferase.

11. The method for acyltransferase reaction according to claim 2, wherein the acyltransferase is a macromolecular polymerization enzyme and a macromolecular compound is synthesized in a reaction in which an acyl group donor, acyl group receptor, coenzyme A and acyltransferase are contained in the reaction system at the same time, an acyl group of the acyl group donor is transferred to coenzyme A by a chemical

thioester exchange reaction to give an acyl coenzyme A and an acyl group of the acyl coenzyme A is transferred to the acyl group receptor.

5 12. The method for acyltransferase reaction according to claim 11, wherein an acyltransferase reaction is repeated using acyl coenzyme A or a product by the acyltransferase reaction as an acyl group receptor whereby the macromolecular compound is produced.

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13. The method for acyltransferase reaction according to claim 11, wherein the acyl thioester is acyl ester of aromatic thiol.

15 14. The method for acyltransferase reaction according to claim 13, wherein the acyl ester of aromatic thiol is hydroxyalkanoate thiophenyl ester.

15. The method for acyltransferase reaction according to 20 claim 14, wherein the hydroxyalkanoate thiophenyl ester is 3-hydroxyalkanoate thiophenyl ester.

16. The method for acyltransferase reaction according to claim 15, wherein the 3-hydroxyalkanoate thiophenyl ester is 25 3-hydroxybutyrate thiophenyl ester.

17. The method for acyltransferase reaction according to claim 11, wherein the macromolecular polymerization enzyme is

polyhydroxy alkanoate synthase.

18. The method for acyltransferase reaction according to
claim 17, wherein the polyhydroxy alkanoate synthase is derived
5 from genus *Ralstonia*.

19. The method for acyltransferase reaction according to
claim 18, wherein the genus *Ralstonia* is *Ralstonia eutropha*.

10 20. The method for acyltransferase reaction according to
claim 19, wherein *Ralstonia eutropha* is *Ralstonia eutropha* ATCC
17699.

21. A production process of a sphingoid base using the
15 acyltransferase reaction claimed in any of claims 7 to 9.

22. The production process according to claim 21, wherein the
sphingoid base is 3-ketodihydrosphingosine.

20 23. A production process of a ceramide using the
acyltransferase reaction claimed in claim 10.

24. In a production process of a macromolecular compound
using the acyltransferase reaction claimed in any of claims 11
25 to 20 above, a production process of polyester in which the
macromolecular compound is polyester.

25. The production process of the polyester according to

claim 24, wherein the polyester is polyhydroxy alkanoate.

26. The production process of the polyester according to
claim 25, wherein the polyhydroxy alkanoate is poly(3-hydroxy
5 alkanoate).

27. The production process of the polyester according to
claim 26, wherein the poly(3-hydroxy alkanoate) is poly(3-
hydroxy butyrate).